DECISIONS ABOUT INSULATION

TEXAS AGRICULTURAL EXTENSION SERVICE

The Texas A&M University System

Dear Energy Saver:

Insulation in walls, floors and ceilings is necessary to lower home energy consumption by reducing waste. Insulation can be added to existing construction and to new construction. Although insulation is easier to add during the construction phase, it can be added successfully to existing homes.

This letter series and other educational programs are provided at no charge by the Texas Agricultural Extension Service. This information should enable you to reduce the energy consumption in your home. If you would like to receive other publications or know more about Extension programs, please contact me.

Sincerely,

_____

County Extension Agent (Signature)

The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners' Courts of Texas Cooperating

L-1631

TEXAS AGRICULTURAL EXTENSION SERVICE

The Texas A&M University System

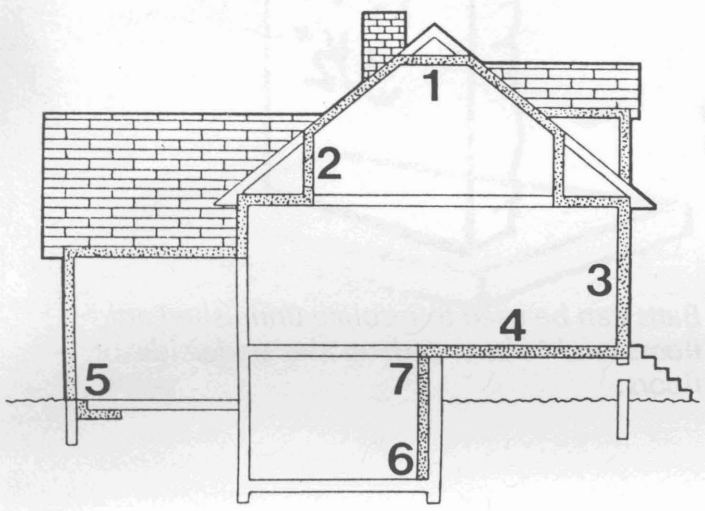
Save Home Energy

DECISIONS ABOUT INSULATION

If you are looking for a way to control the amount of fuel consumed in heating and cooling your home, consider insulating. Insulation is resistant to the flow of air through it. This resistance prevents interior air, which has been heated or cooled with costly fuels, from flowing out of ceilings, walls and floors. The insulation also prevents outside heat and cold from moving into the house. In addition, insulation increases comfort by reducing the loss of body heat by radiation to cold floors, walls and ceilings in the winter. Insulation lowers the radiant temperature in summer and makes people more comfortable. Insulation also reduces drafts and increases accoustical privacy.

Homes should be insulated in:

1. Unfinished attics
2. Finished attics — between ceiling joists
3. Exterior walls
4. Floors above crawl spaces
5. Perimeter of slab-on-grade
6. Basement walls
7. Duct work and plumbing in uninsulated areas



Recommendations for amounts of insulation for Texas homes are:

Attics	R-26
Exterior walls	R-11 to R-13
Floors over crawl spaces	R-11 to R-19
Duct work and hot water lines in uninsulated areas	R-9 to R-11

The R number or value is used to show the resistance of the insulation to heat flowing through it. The higher the R number, the more resistant the insulation. The air spaces in the insulation material or product actually slow down the flow of air through the material. **Always compare and buy insulation by R value** instead of by number of inches. Table 1 shows the different amounts of various insulating materials required to achieve the same R number.

Table 1. Approximate thickness required for certain R values.

	Batts or Blankets		Loose-fill (poured-in)			Foamed-in
R Values	Glass Fiber	Rock Wool	Glass Fiber	Rock Wool	Cellulosic Fiber	Urea Formaldehyde
R-11	3½″	3″	5″	4″	3″	2½ - 2¾″
R-19	6″	5¼″	8″ - 9″	6″ - 7″	5″	4″ - 4¾″
R-22	6½″	6″	10″	7″ - 8″	6″	4½″ - 5½″
R-30	9½″	9″	13″ - 14″	10″ - 11″	8″	6″ - 7½″
R-38	12″	10½″	17″ - 18″	13″ - 14″	10″ - 11″	7½″ - 9½″

If your house has adequate insulation in the ceiling, walls and floor, increased energy efficiency can be obtained by adding some form of protection to windows, skylights, window walls and other glass areas. Caulking and weatherstripping all doors and glass areas and caulking all exterior areas where materials are joined will provide additional reduction of energy waste and consumption.

When buying insulation, consider:

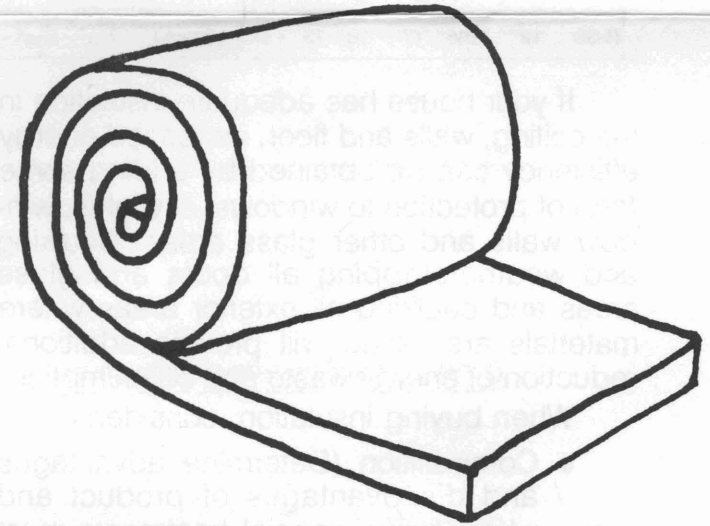
- Composition (Determine advantages and disadvantages of product and what, if any, special treatments must be made to the product.)
- Fire safety (Some are combustible if not treated or installed properly.)
- Odor
- Corrosiveness (to metals)
- R value (thermal resistance)
- Installation forms and methods

The most frequently used insulating materials are cellulose, mineral wool, urea formaldehyde, extruded polystyrene bead board and urethane board. A brief explanation of these insulating products and their characteristics can be found in Table 2.

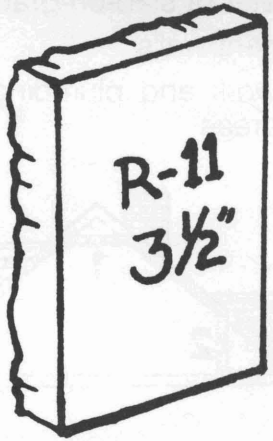
Prepared by Extension housing and home furnishings specialists, The Texas A&M University System.

Table 2. Insulating products and their characteristics.

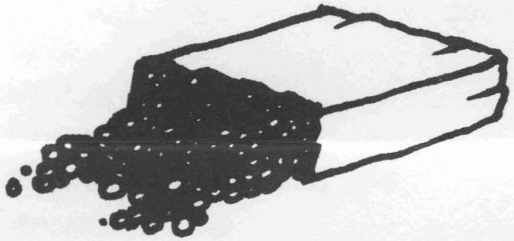
Product	Composition	Fire Safety	Moisture Resistance	Odor	Rodent and Vermin Resistance	Corrosiveness	Approximate R Value Per Inch	Installation Forms
Cellulose	Vegetable and wood fibers	Safety questionable if fibers are not treated with flame retardant chemicals. Fire retardant chemicals can leach out or turn into a gas.	Readily absorbs moisture which may affect flame retardant chemicals and may cause compacting and facilitate fungi growth.	Generally none	Some may contain starch and attract rodents and vermin. Needs boric acid or borax to create resistance.	Noncorrosive, but flame retardant chemicals may be corrosive.	3.1 - 3.7	Spray-on Pour-in Blow-in
Mineral Wool	Rock slag or glass	Will not burn, but paper moisture or vapor barrier may burn.	Collects on surface of fibers, but R value is regained when dry.	None	Does not attract or deter.	Noncorrosive	Batts and blankets = 3.5 - 3.75 Loose Fill = 2-3	Batts Blankets Rigid board Blow-in Pour-in
Urea Formaldehyde	Urea, formaldehyde and a catalyst	Resists spread of flame; tends to shrivel and char.	Absorbs moisture but dries to original condition.	Some odor during curing and after curing if it absorbs moisture.	Does not attract or deter; resistant to common molds; and mildly bactericidal.	Noncorrosive	4 - 4.5 4.1 average	Foam-in
Plastics	Polystryene (expanded) Urethane Polyurethane	Combustible; must be covered with ½" gypsum board or equivalent.	May absorb moisture but dries to original condition.	None	Does not attract or deter	Noncorrosive	Varies up to 6.25	Rigid board



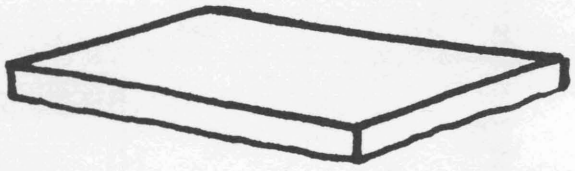
Blankets are used to insulate unfinished attic floors and rafters and the underside of floors.



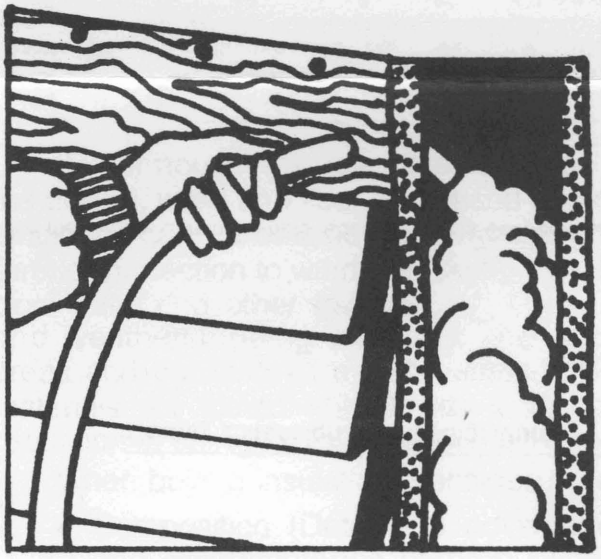
Batts can be used to insulate unfinished attic floors and rafters and on the underside of floors.



Loose fill insulation may be poured or blown in unfinished attic floors or blown in finished attic floors and frame walls and the underside of floors.



Rigid board is used to insulate basement walls.



Foamed-in-place insulation can be used to insulate finished frame walls and unfinished attic floors.

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